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Managing safety and environmental risks on Line 24 (Vales Point – Eraring)

RIT-T Project Assessment Conclusions Report

Region: Newcastle and Central Coast

Date of issue: 2 June 2022

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Summary

Transgrid is applying the Regulatory Investment Test for Transmission (RIT-T) to options for mitigating safety and environmental risks caused by the deteriorating condition of Line 24. Publication of this Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process.

Spanning a route of 30km, Line 24 is a 330 kV transmission line that runs between Vales Point and Eraring substations. It was originally commissioned in 1969 as part of the line which ran from Vales Point substation to Newcastle substation. The section of Line 24 being addressed by this RIT-T is the single circuit section between the Eraring cut-in and Vales Point substation, a length of approximately 28km. This section is comprised of 79 steel towers.

Line 24 is a key link between two generators on the NSW Central Coast. It will continue to play a central role in supporting the flow of energy to take advantage of naturally-diverse weather patterns, and in the safe and reliable operation of the power system throughout and after the transition to a low-carbon electricity future.

The transmission line mainly traverses through semi-urban and forested areas. Two generators at Eraring and Vales Point, which are connected to Transgrid's Eraring and Vales Point substations, respectively, together contribute more than 4GW[1] to the National Electricity Market. Line 24 connects the two substations which are key nodes on the transmission network. Additionally, Vales Point substation is a customer connection point supplying Ausgrid's 132 kV network in the Western Lake Macquarie area.

Condition issues that will impact the safe and reliable operation of the network have been found on the line. These raise a number of risks associated with asset failure, including safety and environmental (bushfire) risks.

Table E-1 Condition issues along Line 24 and their consequences

Issue	Consequences if not remediated
Corrosion of tower steel members, including buried legs and ground line steel corrosion	Steel corrosion, particularly of critical members, can lead to structural failure of tower
Tower asbestos paint	Potential asbestos related safety risks
Corroded fasteners	Structural failure
Deteriorated grillage foundation	Structural failure
Corroded insulators and conductor attachment fittings	Conductor drop
Corrosion of earthwire attachment fittings	Conductor drop
Deteriorated tower earthing	Public safety risk increase in case of fault
Deteriorated anti-climber and structure signage	Public safety risk

As the asset condition deteriorates over time, the likelihood of failure and subsequent risks will increase should these issues not be addressed.

[1] Summation of approximate generation totals from Vales Point Power Station and Eraring Power Station.

Identified need: managing safety and environmental risks from corrosion on Line 24

The proposed investment will enable Transgrid to manage safety and environmental risks on Line 24. Options considered under this RIT-T have been assessed relative to a base case. Under the base case, no proactive capital investment is made and the condition of Line 24 will continue to deteriorate.

Further deterioration of the condition of the affected assets due to corrosion would mean an increase in bushfire and safety risks along Line 24 as the likelihood of failure increases. If left untreated, corrosion of some of the vital components of the steel towers could result in incidents such as conductor drop and tower collapse. Such incidents could have serious safety consequences for nearby residents and members of the public, as well as Transgrid field crew members who may be working on or near the assets.

Transgrid manages and mitigates bushfire and safety risk to ensure they are below risk tolerance levels or 'As Low As Reasonably Practicable' ('ALARP'), in accordance with Transgrid's obligations under the New South Wales Electricity Supply (Safety and Network Management) Regulation 2014 and Transgrid's Electricity Network Safety Management System (ENSMS).[2]

The proposed investment will enable Transgrid to continue to manage and operate this part of the network to a safety and risk mitigation level of ALARP. Consequently, it is considered a reliability corrective action under the RIT-T. A reliability corrective action differs from a 'market benefits'-driven RIT-T in that the preferred option is permitted to have negative net economic benefits on account of it being required to meet an externally imposed obligation on the network business.

No submissions received in response to Project Specification Consultation Report

Transgrid published a Project Specification Consultation Report (PSCR) on 10 December 2021 and invited written submissions on the material presented within the document. No submissions were received in response to the PSCR.

No material developments since publication of the PSCR

No additional credible options were identified during the consultation period following publication of the PSCR.

No material changes have occurred since the PSCR which have made an impact on the preferred option.

Option 1 remains the preferred option at this stage of the RIT-T process.

Transgrid considers refurbishing Line 24 is the only credible option

Transgrid put forward for consideration one technically and commercially feasible option[3]: refurbishing the existing line by remediating or replacing the identified components. This option (Option 1) involves the refurbishment of Line 24 including replacement of asset components, earthwire, remediation of steelwork and foundations.

[2] Transgrid's ENSMS follows the International Organization for Standardization's ISO31000 risk management framework which requires following hierarchy of hazard mitigation approach

[3] As per clause 5.15.2(a) of the NER.

The primary driver for the identified need is to mitigate bushfire and safety risks associated with condition issues on Line 24 caused by corrosion. Two other options to address the need were considered but were not progressed further as they were determined technically or commercially non-feasible when assessed against the preferred option. These are summarised in the following table.

Transgrid expects coronavirus (COVID-19) to continue to impact its suppliers and disrupt their supply chains, although at this time the extent of the current or future impact is unknown. Consequently, some of the costs and timing associated with the works outlined in this document may be affected.

All costs presented in this PACR are in 2021/22 dollars.

Table E-2 Options considered

Option	Description	Capital costs ($M 2021/22)	Operating costs ($ per year)	Remarks
Option 1	Line refurbishment	8.9 (+/- 25%)	10,000	Most economical and preferred option
Option 2	Line dismantling	~ 8.1	0	Line dismantling is not technically feasible. Dismantling Line 24 will reduce the supply capability from Northern NSW network to the Greater Sydney region, which may lead to reliability of supply issues.
Option 3	New transmission line from Vales Point substation to Eraring substation	~ 52.7	Not considered	Due to significant costs of this option, a new 330 kV transmission line from Vales Point substation to Eraring substation is not commercially feasible.

Non-network options are not able to assist in this RIT-T

Transgrid does not consider non-network options to be commercially and technically feasible to assist with meeting the identified need for this RIT-T, as non-network options will not mitigate the safety and environment risk posed as a result of corrosion-related asset deterioration.

Conclusion: refurbishment of Line 24 is optimal

The optimal commercially and technically feasible option presented in this PACR – Option 1 (line refurbishment) – is the preferred option to meet the identified need.

Moving forward with this option is the most prudent and economically efficient solution to manage and mitigate safety and environmental risk to ALARP. Consequently, it will ensure Transgrid's obligations under the New South Wales Electricity Supply (Safety and Network Management) Regulation 2014 and Transgrid's Electricity Network Safety Management System (ENSMS) are met.

The estimated capital expenditure associated with this option is $8.9 million +/- 25 per cent. Routine operating and maintenance costs relating to planned checks by Transgrid field crew are approximately $10,000 per year – similar to the cost under the base case. Transgrid calculates that the avoided risk cost by undertaking Option 1 is approximately $8.8 million per year.

This preferred option, Option 1, is found to have positive net benefits under all scenarios investigated and on a weighted basis will deliver $102.4 million in net economic benefits. Transgrid also conducted sensitivity analysis on the net economic benefit to investigate the robustness of the conclusion to key assumptions. Transgrid's analysis concluded that the costs are less than the weighted benefits from mitigating bushfire and safety risks under all scenarios.

The works will be undertaken between 2021/22 and 2022/23. Planning and procurement will conclude in 2021/22, while project delivery and construction will occur in 2022/23.

All works will be completed in accordance with the relevant standards by 2022/23 with minimal modification to the wider transmission assets. Necessary outages of affected line(s) in service will be planned appropriately in order to complete the works with minimal impact on the network.

The analysis undertaken and the identification of Option 1 as the preferred option satisfies the RIT-T. Option 1 is the preferred option in accordance with NER clause 5.16.1(b) because it is the credible option that maximises the net present value of the net economic benefit to all those who produce, consume and transport electricity in the market. This preferred option, Option 1, was found to have the highest net economic benefit or least lifecycle cost while also maintaining compliance with regulatory and safety obligations. Transgrid also conducted sensitivity analysis on the net economic benefit to investigate the robustness of the conclusion to key assumptions. Transgrid finds that under all sensitivities, Option 1 delivers the most net benefit.

Next steps

This PACR represents the final step of the consultation process in relation to the application of the Regulatory Investment Test for Transmission (RIT-T) process undertaken by Transgrid. It follows a Project Specification Consultation Report (PSCR) released in December 2021. No submissions were received in response to the PSCR.

The second step, production of a Project Assessment Draft Report (PADR), was not required as Transgrid considers its investment in relation to the preferred option to be exempt from that part of the RIT-T process under NER clause 5.16.4(z1). Production of a PADR is not required[4] due to:

- the estimated capital cost of the proposed preferred option being less than $46 million;
- the PSCR stating:
  - the proposed preferred option (including reasons for the proposed preferred option)
  - the RIT-T is exempt from producing a PADR
  - the proposed preferred option and any other credible option will not have material market benefits[5] except for voluntary load curtailment and involuntary load shedding

[4] In accordance with NER clause 5.16.4(z1)(4), the exemption from producing a PADR will no longer apply if Transgrid considers that an additional credible option that could deliver a material market benefit is identified during the consultation period. No additional credible options were identified.

[5] As per clause 5.16.1(c)(6)

- the RIT-T proponent considers that there were no PSCR submissions identifying additional credible options that could deliver a material market benefit; and
- the PACR addressing any issues raised in relation to the proposed preferred option during the PSCR consultation.

Parties wishing to raise a dispute notice with the AER may do so prior to 4 July 2022 (30 days after publication of this PACR[6]). Any dispute notices raised during this period will be addressed by the AER within 40 to 120 days, after which the formal RIT-T process will conclude.

Further details on the RIT-T can be obtained from Transgrid's Regulation team via RIT-TConsultations@transgrid.com.au. In the subject field, please reference 'Line 24 PACR'.

[6] Additional days have been added to cover public holidays